

## PATENT ABSTRACTS OF JAPAN

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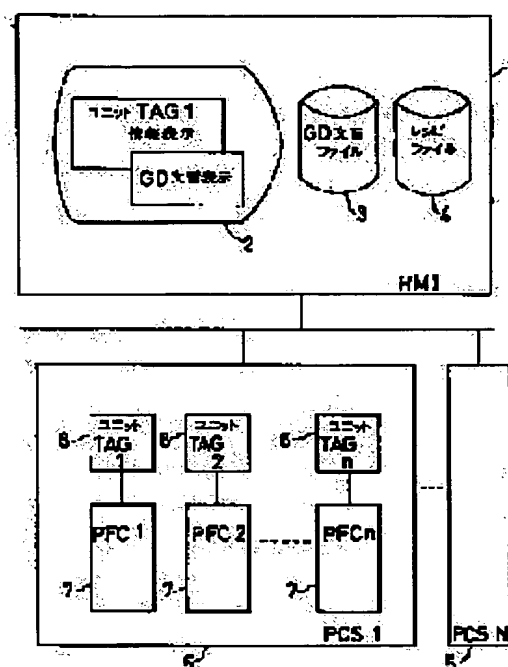
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## (54) OPERATION GUIDE DISPLAY DEVICE FOR PROCESS OF MULTI-ITEMS PRODUCTION

## (57)Abstract:

**PROBLEM TO BE SOLVED:** To provide an operation guide display device for process of multi-items production with which precise guidance display suitable for the production line of multi-items in small quantities is enabled.

**SOLUTION:** A human/machine interface(HMI) 1 is composed of a display device 2, guidance(GD) word file 3 registering operation guidance words and recipe file 4 registering a procedure function chart(PFC) and a production condition parameter in a program language for graphically describing the successive processing executing procedure of product production for each item. The PFC of this recipe file 4 registers quotation information for quoting GD words. The PFC in this recipe file 4 is downloaded to a unit TAG 6 as a file for managing the execution condition of a unit producing device in a process control system connected to the HMI 11 and controls the unit producing device.



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## CLAIMS

[Claim(s)]

[Claim 1] A means to register the reference information for quoting operation guidance \*\*\*\* into the procedure function chart which is the programming language which describes the order of the real way of sequential processing, such as a product manufacture procedure, in graphic, A means to store in the recipe file which is an information file for carrying out a management store with a parameter required for a product manufacture for every form of the product which should manufacture the procedure function chart into which the aforementioned operation guidance \*\*\*\* was registered by this means, Operation guide display for multi-form production processes characterized by downloading to the unit TAG which is a data file for carrying out an execution control for every unit equipment for a product manufacture of the aforementioned procedure function chart stored in this recipe file, and operating it.

[Claim 2] Operation guide display for multi-form production processes characterized by DLing to the unit TAG which is a data file for carrying out an execution control for every unit equipment for a product manufacture of the aforementioned procedure function chart into which the reference information was registered by means to register the reference information for quoting operation guidance \*\*\*\* into a procedure function chart, and this means, and operating it.

[Claim 3] A means to register the reference information for quoting operation guidance \*\*\*\* into a procedure function chart, A means to store in the recipe file which is an information file which carries out a management store with a parameter required for a product manufacture for every form of the product which should manufacture the aforementioned procedure function \*\*\*\* into which the reference information was registered by this means, Operation guide display for multi-form production processes characterized by downloading and operating the aforementioned procedure function chart stored in this recipe file in batch TAG which is the data file which manages the running state for every batch.

[Claim 4] The \*\*\*\* file which stored two or more operation guidance \*\*\*\*s, and a means to register into a procedure function chart the reference information for quoting the aforementioned operation guidance \*\*\*\* stored in this \*\*\*\* file, A means to store the aforementioned procedure function chart into which the aforementioned reference information was registered by this means in the recipe file which is a data file for managing as a recipe, A means to download in batch TAG which is the data file which carries out the execution control of the aforementioned procedure function chart stored in this recipe file for every batch, and to operate it, By means to store in the aforementioned recipe file The aforementioned procedure function chart with which the stored aforementioned reference information was registered is downloaded to the unit TAG which is the data file which carries out an execution control for every unit equipment for a product manufacture. having had a means to make it operate -- the operation guide display for multi-form production processes characterized by things

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## DETAILED DESCRIPTION

## [Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] this invention relates to the operation guide display for multi-form production processes especially with the same equipments, such as petrochemistry, a fine chemicals, toiletries goods, and a film, about the equipment which manufactures the product of many forms with which the manufacture technique is different.

[0002]

[Description of the Prior Art] In the decentralized control type production-process system which consists of a human machine interface (henceforth HMI), and a process control station (henceforth PCS), although the unusual content is displayed on CRT to a process operating staff by operation guidance \*\*\*\* (henceforth GD sentence word) like "temperature rises" when abnormalities occur on a process, such a GD sentence word display function turns into the function performed by HMI.

[0003] Such [ conventionally ] a GD sentence word display function gave the indicator to each GD sentence word registered into HMI, and was made to display it by carrying out ON/OFF of the indicator according to the event which should display GD sentence words, such as attainment to the checking point on abnormal-condition occurrence or a process, by PCS.

[0004] Moreover, in recently, PFC is performed on HMI and the method of registering GD sentence word as a part of execute step of PFC is learned. It is managed as a part of information file (henceforth a recipe) which stored PFC and a parameter required for a product manufacture for every form in this technique.

[0005]

[Problem(s) to be Solved by the Invention] Since GD sentence words which are therefore needed for the manufacture technique in a multi-form production differ among the above-mentioned conventional examples in the case of the 1st conventional example, by GD sentence word which can be registered by the system, the number may be insufficient. namely, the case where GD sentence word to all forms is registered beforehand -- GD sentence per form -- the number of words decreases Moreover, when the same equipment, for example, the same reactor, or a dryer exists in the production process of a different form, it is necessary to also register GD sentence word of the same content as another GD sentence word. In order to specify with which equipment factors, such as failure, generated it when the same product was produced in parallel with the different production line, even if this was not the production process of a different form, it is necessary to register as another GD sentence word.

[0006] b) In order to carry out the soft design of the program of PCS, and the GD sentence word processing separately, engineerings, such as an agreement of a delivery indicator, are necessary.

[0007] c) In correspondence of GD sentence word and equipment, the relation of GD sentence word and the product production unit under execution (henceforth a batch) does not become [ obvious ] obvious but. For this reason, a considerable engineering is required when the history of GD sentence word generated per batch needs to be taken.

[0008] d) GD sentence word cannot display beforehand thing \*\*\*\*\* displayed as a result of a factor event, and GD sentence word about the event of a future execution schedule.

[0009] Moreover, since it will be applied if the form which in the case of the conventional example of the above 2nd GD sentence word is contained in the recipe for every product modality, and is produced is chosen, when it is a multi-form production, GD sentence word shortage does not occur. Moreover, since GD sentence word is registered as a part of program of PFC, an engineering like the above-mentioned b does not occur. Moreover, GD sentence word about the event of an execution schedule will also be able to be beforehand displayed by adding the function which chooses non-performed PFC step and displays the content in the future.

[0010] however, the parameters which show a manufacture conditions differ in this conventional example -- even if it accepts and comes out, a manufacture procedure is an identity or a similar recipe and the content of GD sentence word is the same, it registers for every recipe -- it can kick -- it does not become

[0011] b) It is GD sentence word to a rough manufacture procedure, and while performing a fine GD sentence word like [ in the case of performing by PCS ], for example, one process, GD sentence word when abnormalities occur cannot be \*\*\*\*\*ed.

[0012] c) the relation between GD sentence word and a batch -- obvious -- but -- the relation with a manufacturing installation -- obvious -- it is not . For this reason, when there are two or more identities or similar manufacturing installations, the readiness at the time of performing concrete operation in response to GD sentence word becomes bad.

[0013] d) Since it becomes a part [ PFC program ], a constraint of a limit of the number of characters etc. generates GD sentence word further only by the character string from a capacity-constraint etc.

[0014] Therefore, the purpose of this invention is to offer the system which gives GD sentence words suitable for an operating staff, and abundant in a multi-form production.

[0015]

[Means for Solving the Problem] The operation guide display for multi-form production processes of this invention A means to register the reference information for quoting operation guidance \*\*\*\* into the procedure function chart which is the programming language which describes the order of the real way of sequential processing, such as a product manufacture procedure, in graphic, A means to store in the recipe file which is an information file for carrying out a management store with a parameter required for a product manufacture for every form of the product which should manufacture the procedure function chart into which the aforementioned operation guidance \*\*\*\* was registered by this means, It is characterized by downloading to the unit TAG which is a data file for carrying out an execution control for every unit equipment for a product manufacture of the aforementioned procedure function chart stored in this recipe file, and operating it.

[0016] Moreover, it is characterized by DLink operation guide display for multi-form production processes of this invention to the unit TAG which is a data file for carrying out an execution control for every unit equipment for a product manufacture of the aforementioned procedure function chart into which the reference information was registered by means to register the reference information for quoting operation guidance \*\*\*\* into a procedure function chart, and this means, and operating it.

[0017] Furthermore, the operation guide display for multi-form production processes of this invention A means to register the reference information for quoting operation guidance \*\*\*\* into a procedure function chart, A means to store in the recipe file which is an information file which carries out a management store with a parameter required for a product manufacture for every form of the product which should manufacture the aforementioned procedure function \*\*\*\*\* \*\* into which the reference information was registered by this means, It is characterized by downloading and operating the aforementioned procedure function chart stored in this recipe file in batch TAG which is the data file which manages the running state for every batch.

[0018] Furthermore, the operation guide display for multi-form production processes of this invention The \*\*\*\* file which stored two or more operation guidance \*\*\*\*s, and a means to register into a procedure function chart the reference information for quoting the aforementioned operation guidance \*\*\*\* stored in this \*\*\*\* file, A means to store the aforementioned procedure function chart into which the aforementioned reference information was registered by this means

in the recipe file which is a data file for managing as a recipe, A means to download in batch TAG which is the data file which carries out the execution control of the aforementioned procedure function chart stored in this recipe file for every batch, and to operate it, By means to store in the aforementioned recipe file having had a means to have DLed to the unit TAG which is the data file which carries out an execution control for every unit equipment for a product manufacture of the aforementioned procedure function chart with which the stored aforementioned reference information was registered, and to operate it -- it is characterized by things

[0019]

[Embodiments of the Invention] Hereafter, 1 operation gestalt of this invention is explained based on the drawing 1 or the drawing 3.

[0020] Drawing 1 is a block diagram showing the configuration of the multi-form production-process system wide by this invention, consists of displays 2, such as CRT which displays the information about the unit TAG mentioned later, GD sentence word, etc. on HMI1, and GD sentence word file 3 and the recipe file 4 in which GD sentence word is filed, and the procedure function chart PFC and a parameter required for a product manufacture are stored in this recipe file 4 for every form.

[0021] Moreover, the process control system 5 of two or more (N) individuals installed for every form of a product is connected to HMI through the network. n units TAG6 and n unit controllers 7 are contained in each of such PCS5. These unit controllers 7 are controllers which control two or more manufacturing installations required for a manufacture of the product of one form, and a unit TAG is a file which memorizes the procedure function chart PFC (PFC1, PFC2, --, PFCn) and parameter which are a program for a control of the manufacturing installation which corresponds to these unit controller C. The unit controller 7 is controlled by these PFCs (PFC1, PFC2, --, PFCn) and parameters.

[0022] Drawing 2 is a flow chart which shows the status that the file name of GD sentence word file 3 was registered to the above-mentioned procedure function chart PFCn (1 - n). At step S1, guidance \*\*\*\* corresponding to the address 002 of a file name GDTXT01 in guidance \*\*\*\* corresponding to the address 001 of a file name GDTXT01 shows again a mode that it is applied, respectively, by step S2, for example.

[0023] Moreover, drawing 3 is the flow chart which shows the example of the procedure function chart PFC for every form, for example, a form A1 is produced according to the process which two kinds of matter B and C is made to react, and is dried.

[0024] Next, an operation of the operation guide display for multi-form production processes constituted as mentioned above is explained one by one.

[0025] 1) Register GD sentence word file name which corresponds to the arbitrary steps of PFC in a recipe.

[0026] 2) Specify the recipe corresponding to the form which it is going to manufacture for every batch. It downloads to the unit TAG (TAG1, TAG2, --, TAGn) corresponding to the equipment which uses a recipe or its part for a manufacture at the time of batch manufacture execution (henceforth DL), and a manufacture of a product is performed.

[0027] 3) Update according to PFC execution progress within PCS by the content of each step which registered GD document-file name in a unit TAG by 1.

[0028] 4) When GD display is demanded, without specifying PFC step about the arbitrary units TAG by the display 2, display GD document corresponding to GD document-file name. This means the display of GD sentence word about the present status.

[0029] 5) When PFC step is specified and GD sentence word display is demanded about the units TAG (TAG1, TAG2, --, TAGn) arbitrary at a display 2, display GD sentence word corresponding to the file name registered by 1 to the step. This will mean the display of GD sentence word about the event of an execution schedule in the future.

[0030] Thus, in the operation guide display for multi-form production processes of this invention, it is the method to which GD sentence word is made to correspond to the step of PFC like the 2nd conventional technique fundamentally mentioned above. However, the equipment of this invention registers indicator informations, such as a document-file name for quoting not the GD

sentence word itself but GD sentence word, into 1PFC as compared with this conventional technique. and these GD sentence words -- GD sentence -- PFC (the whole or low order hierarchy in the case of a layered structure) containing being stored in the area which can be referred to in common from each batch in a word file, and 2GD indicator information has the characteristic feature in the process control systems PCS1 and PCS2 corresponding to execution equipment, --, two points of performing by unit TAGn in PCSN DLing

[0031] this invention is not limited to the above operation gestalt, and various modifications are possible for it.

[0032] That is, in the above-mentioned operation gestalt, although HMI is equipped with GD sentence word file 3, you may install it in other stations on a network.

[0033] moreover, the registration of GD sentence word carried out to PFC -- every in a recipe -- the method of registering the whole file name of GD sentence word to PFC, or one recipe -- receiving -- GD sentence word file of -- \*\* -- registering -- every in the recipe -- PFC -- setting -- a part of GD sentence word file (extension etc.) or GD sentence -- the system which takes the method which registers the display position in a word file (\*\*\*\* address) etc. is also possible

[0034] In this case, it is applicable even if PCS is the model which cannot treat alphabetic information.

[0035] Furthermore, in the above-mentioned operation gestalt, although it is the method which DLs to PCS PFC contained in the recipe of the form which corresponds at the time of every batch production and form changeover etc., you may DL PFC to PCS at the time of system starting etc., without synchronizing with manufacture timing.

[0036] That is, GD sentence word file name which corresponds to the arbitrary steps of 1PFC is registered, before performing the PFC, it DLs to PCS, and this method is \*\*\*\*. (It is set to two or more PFCs when manufacture procedures differ by many forms.) And PFC identification which shows the manufacture procedure of the product is registered into a recipe.

[0037] 2) Specify the recipe corresponding to the form which it is going to manufacture for every batch. It DLs to the unit TAG corresponding to the equipment which uses for a manufacture PFC identification included in a recipe at the time of batch manufacture execution, and a manufacture of a product is performed.

[0038] The following is the same as that of steps 3-5 in the above-mentioned operation gestalt.

[0039] Since DL of PFC at the time of a batch manufacture becomes unnecessary while a \*\*\*\* constraint will arise, if a manufacture procedure is restricted to selection and recombination of the order of the real way in within the limits of it according to this method, since PFC number is restricted to PCS capacity as compared with the above-mentioned operation gestalt, a reliability -- a production can do HMI which should manage a recipe also in the time of abnormalities -- improves.

[0040] Furthermore, although the above-mentioned operation gestalt is a news method from GD which depends on PFC DLed by PCS, it is good also as a method which \*\*\*\*s GD by PFC of the high order hierarchy performed by HMI in hierarchized PFC.

[0041] That is, in this method, GD sentence word file name which corresponds to the arbitrary steps of PFC in 1 recipe is registered.

[0042] 2) Specify the recipe corresponding to the form which it is going to manufacture for every batch. At the time of batch manufacture execution, a recipe is transmitted to a batch TAG, and a manufacture of a product is performed. (A process is controlled by starting PFC processing of PCS corresponding to PFC low order hierarchy from HMI in fact.)

3) Update GD document-file name in a batch TAG by the content of 1 according to PFC execution progress of \*\* in HMI.

[0043] The following is the same as that of steps 3-5 in the above-mentioned operation gestalt.

[0044] This method is applied when it is the model which can perform PFC on HMI.

[0045] Although PFC was DLed and operated to the unit TAG in the method to the further above-mentioned operation gestalt, it is also possible to use this together with the method which operates PFC of the above in batch TAG.

[0046] That is, in this method, GD sentence word file name which corresponds to the arbitrary

steps of PFC in 1 recipe is registered.

[0047] 2) Specify the recipe corresponding to the form which it is going to manufacture for every batch. At the time of batch manufacture execution, a recipe is transmitted to a batch TAG, and a manufacture of a product is performed. It doubles with progress of the high order hierarchy PFC performed by HMI, it DLs to the unit TAG corresponding to the equipment which uses PFC of a low order hierarchy for a manufacture, and a manufacture of a product is performed.

[0048] 3) Update GD document-file name in unit TAG / batch TAG by the content of 1 according to PFC execution progress within PCS/HMI.

[0049] The following is the same as that of steps 4-5 in the above-mentioned operation gestalt.

[0050] This method is applied when it is the model which can perform PFC on HMI.

[0051]

[Effect of the Invention] According to this invention, the following effects are acquired.

[0052] a) Since specification of GD document file can be changed for every recipe, manageable GD number can be increased.

[0053] b) Since the information for GD is directly set up on PFC, the engineering is easy.

[0054] c) Since a recipe is DLed by PCS as an information on the patch under manufacture, the relation of GD and a batch becomes obvious.

[0055] d) By adding the function which chooses non-performed PFC step and displays the content, GD about the event of an execution schedule will also be able to be displayed beforehand in the future.

[0056] e) The same, then sharing-ization of GD sentence word can do GD document-file name among arbitrary recipes.

[0057] f) The GD sentence word itself is made with another file. Therefore, GD in arbitrary type (combined use of a chart photograph etc., long-letter-izing, speech information, etc.) becomes possible.

[0058] h) Since GD can be specified to be PFC performed within PCS, the fine news from GD becomes possible.

[0059] g) Since the unit TAG corresponding to the equipment to perform DLs, correspondence of GD and equipment becomes obvious. Moreover, since it becomes the type of GD to equipment, the device name is unnecessary in the GD sentence word itself, and sharing-ization of GD sentence word becomes easy.

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**DESCRIPTION OF DRAWINGS**

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**[Brief Description of the Drawings]**

**[Drawing 1]** It is the configuration block view of the 1 operation gestalt having shown the configuration of the multi-form production-process system wide by this invention.

**[Drawing 2]** It is the flow chart view having shown the step configuration of PFC (1 - n) used for this invention.

**[Drawing 3]** It is the flow chart view which manages the dryness for every form by this invention.

**[Description of Notations]**

- 1 ..... Human machine interface (HMI)
- 2 ..... CRT
- 3 ..... Guidance \*\*\*\* file
- 4 ..... Recipe file
- 5 ..... Process control system (PCS1 - PCS1n)
- 6 ..... Data file (unit TAG)
- 7 ..... Controller (PFC1-PFCn)

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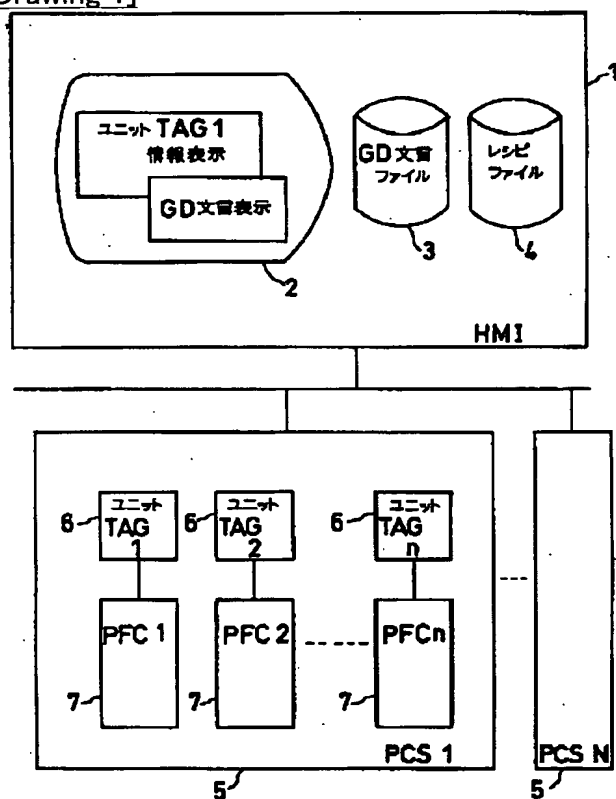
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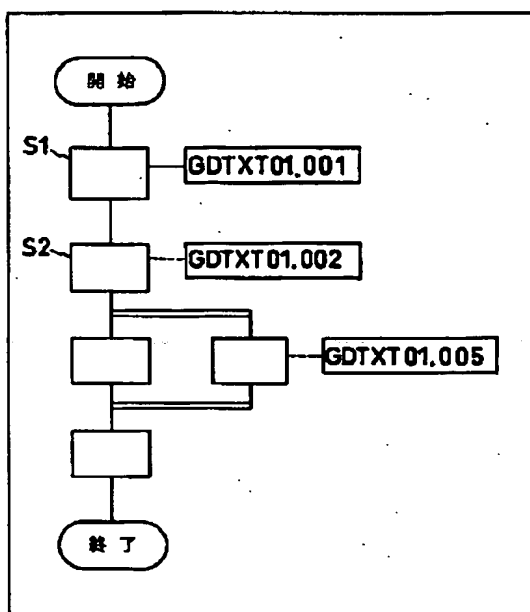
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## DRAWINGS

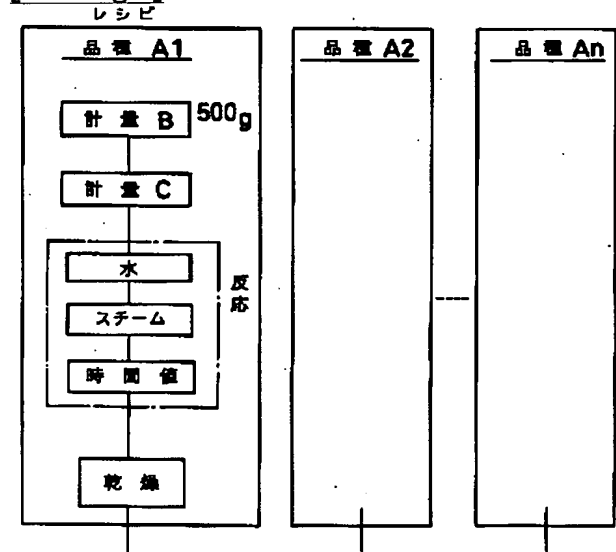
[Drawing 1]



[Drawing 2]



[Drawing 3]



[Translation done.]